DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

OFFICE OF
INSPECTOR GENERAL

February 20, 2007

The Honorable John P. Higgins, Jr.
Chairman, PCIE Audit Committee
Department of Education
400 Maryland Avenue, SW
Washington, DC 20024

Dear Chairman Higgins:

I am pleased to inform the PCIE Audit Committee that the IGATI Curriculum Review Board (ICRB) has completed a review of the IGATI course titled *Using Data Mining Techniques in Audits and Evaluations.* The course was reviewed in accordance with the IRCB's fiscal year 2007 work plan, and was the last IGATI course assessed by the Board. We concluded that the course provided training that was useful to the federal community, but needs some enhancement to ensure class materials are accurate and relevant and course presentation is effective. Although IGATI has ceased operations, our report contains three recommendations to be considered by organizations that may provide this course in the future.

Enclosed is a copy of our final report prepared by the Assistant Inspector General for Audit, U.S. Agency for International Development.

If you have any questions, please call me on (202) 927-6516.

Sincerely,

/s/
Marla A. Freedman
Chair, ICRB

Enclosure

cc: Helen Lew, Chair
Federal Audit Executive Committee

USAID
FROM THE AMERICAN PEOPLE

Office of Inspector General

February 14, 2007

MEMORANDUM

FOR: Marla A. Freedman, Chair, Inspectors General Auditor Training Institute (IGATI), Curriculum Review Board.

FROM: Joseph Farinella, Assistant Inspector General for Audit, USAID/OIG.

SUBJECT: Final Report of ICRB Review of IGATI Course: Using Data Mining Techniques in Audits and Evaluations, November 7-8, 2006.

This memorandum transmits the final report on this subject. Our objective was to determine whether the Inspector General Auditor Training Institute course Using Data Mining Techniques in Audits and Evaluations provides training that is useful to the Federal auditors.

As of December 2006 IGATI ceased operations. However, the report contains three recommendations to be considered by organizations that may provide this course in the future.

OFFICE OF THE INSPECTOR GENERAL

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

REVIEW OF THE INSPECTOR GENERAL AUDITOR TRAINING INSTITUTE'S COURSE: USING DATA MINING TECHNIQUES IN AUDITS AND EVALUATIONS

FEBRUARY 2007

OBJECTIVE

The objective of this review was to determine whether the Inspector General Auditor Training Institute (IGATI) -- course *Using Data Mining Techniques in Audits and Evaluations* provides training that is useful to the Federal Inspector General community.

BACKGROUND

According to the course overview provided in its Fiscal Year (FY) 2006 catalog[1]:

This course is to help the auditors to understand how to use Data Mining to assist in their auditing of large data. Because of the Paper Reduction Act, any audits are going toward looking at large chunks of data from a database. Knowing how to ask for the data, knowing where to look, and having the basic skills will allow you to be successful in your auditing career.

Course learning objectives participants hope to achieve upon completion of the course include:

- The methodologies of Data Mining,
  - Learning the process of Data Mining,
  - Learning understanding the approach to Data Mining,
- How to read Data Base Architecture,
  - Reading Oracle Database Structure,
  - Reading SQL Server Database Structure,
  - Understanding common naming conventions to help you understand the data,
  - Learning basic rules in database structure,

  How to get your results,
  - Learning SQL basics,
  - SQL Aggregation Reports.

The course is recommended for Office of Inspector General staff members, including investigators, inspectors, evaluators, or administrative support personnel, with little or no knowledge of Data Mining. Prerequisites for this course include Knowledge of MS Access; work on Database projects and IS background is helpful. The course level is listed as intermediate.

Each participant earns 16 Continuing Professional Education credits by attending 2 days of class training and the tuition is $425 per student.

For benchmarking purposes, we review two courses- one offered by IGATI and the other by the United States Department of Agriculture (USDA) Graduate School. The course offered by IGATI is titled *Data Gathering and Analysis with*

[1] Fiscal Year (FY) 20076 catalog is not available.

IDEA 2004 and the USDA's course is entitled I*DEA Data Analysis Software for Government: Introduction*[2].

*I*GATI course: *Data Gathering and Analysis with IDEA 2004* is described in 2006 catalog as a course that *provides participants with practical experience in gathering and analyzing data in audit, investigations, and evaluation studies. This workshop utilizes IDEA 2004 software. Participants will learn how to carefully organize, retrieve, and analyze data. This is hands on course with each participant having their own workstation.*

Course learning objectives participants hope to achieve upon completion of the course include:

- Request computer-generated data from information system departments,
- Develop an audit plan for reviewing or testing the data,
- Avoid potential delays in processing your data through awareness of some general rules,
- Identify the problem to be quantified or solved by substantive testing,
- Determine data validity,
- Review work to detect errors in formulas, summarizations and extractions of data, and
- Manage the use of IDEA as an analytical tool.

Each participant earns 40 Continuing Professional Education credits by attending 5 days of class training and the tuition is $815 per student.

The USDA course description appeals to a much broader audience whereas the IGATI course is targeted to the Inspector General community. Specific details include:

Course Overview:

Do you need to know how to plan for, manage and use the basic capabilities of IDEA in a government environment? This course, taught by a certified IDEA instructor, provides basic instruction in the use of IDEA software specifically tailored for the government environment. Learn what IDEA can do and how it can add value. This is a hands-on course where participants perform numerous exercises and a case study. Participants structure data analysis in accordance with the types of audits and/or reviews normally performed by the government auditor and analyst. Subject matter includes, but is not limited to: data importing and analysis; gaps and duplicates detection; Benford's Law analysis; multiple file operations (join, append, compare); file extractions (basic, key value and indexed); and sampling.

---

[2] http://www.grad.usda.gov/course_details.php?cid=AUDT7920G

Prerequisites:

Knowledge of personal computers, Windows and spreadsheet applications. IDEA software or demo must be loaded on participant's laptop, and the laptop must have a floppy disk drive in order to load course data.

Objectives:

Identify governing standards, requirements and guidelines

- Plan for and manage the use of IDEA for appropriate objectives
- Discuss and carry out the stages of using IDEA
- Import data into IDEA from both data files and automated report files
- Use the main features of the IDEA software

Each participant earns 16 Continuing Professional Education credits by attending 2 days of class training and the tuition is $775 per student

SCOPE AND METHODOLOGY

The scope of our review is based on classes taught during the following periods:

Class Schedule for
Using Data Mining Techniques in Audits and Evaluations

Dates	Classes Conducted	Students Trained
1. March 28-29, 2006	1	4
2. June 21-22, 2006	1	12
3. November 7-8, 2006	1	5
Total	**3**	**21**

To gain an understanding of the course content, we:

Reviewed the course material for *Using Data Mining Techniques in Audits and Evaluations* course presented by IGATI. Our focus was to determine whether the course materials are:

a. Current,
b. Relevant to the course objective(s),
c. Substantive,
d. Complete to address the course objective(s),
e. Not repetitive of, but built upon, prerequisite courses, and
f. Useful as a reference resource "back at the office."

2. Obtained and analyzed student evaluation forms for the last three classes. For the last three classes, we performed the following to analyze the student evaluations (See Appendix A):
   a. Recomputed composite scores for key questions - content, length of course, students' understanding and usefulness of course material;
   b. Determined for each class, the highest-scored module, the lowest-scored module, and average;
   c. Read narrative comments on the evaluations and noted any reoccurring themes; and
   d. Identified significant trends

3. Observed the November 2006 *Using Data Mining Techniques in Audits and Evaluations* course to gain an understanding of the course curriculum and effectiveness of the course instruction.

4. Conducted telephone interviews with two former students from the November 2006 class, two from the June 2006 class, and one from the

March 2006 class. We conducted the interviews to determine:

a. If expectations were met,
b. Class strengths/weaknesses,
c. Suggestions for improvements, and
d. Usefulness of the course material and the ability to use learned skills in the workplace.

INSPECTOR GENERAL AUDITOR TRAINING INSTITUTE CURRICULUM REVIEW BOARD COURSE ASSESSMENT

We identified opportunities to improve this course to ensure class material is accurate and relevant. As an intermediate-level course, this class plays an important role in the educational development of individuals within the Federal audit community. Consequently, we believe steps should be taken to optimize the effectiveness of the course material and the instruction for *Using Data Mining Techniques in Audits and Evaluations.*

COURSE TITLE

The course title - *Using Data Mining Techniques in Audits and Evaluations* did not accurately reflect the course content. The course focuses on one of the several Data Mining techniques – Microsoft Access at the exclusion of more advanced and complex data mining software. There was no discussion of other advanced techniques or tools. Similarly the limitation of Microsoft Access as a Data Mining technique was not explored. Because only one Data Mining technique was discussed, an appropriate title would be "Microsoft Access as a Data Mining Technique for Auditors and Evaluators".

COURSE MATERIALS

Using Data Mining Techniques in Audits and Evaluations was taught in March, June and November 2006. We observed the class taught in November 2006. During the November class a three-ring binder was provided to the students. The binder consisted of an agenda; Microsoft PowerPoint presentation slides and reference materials. The reference materials consisted of Microsoft Access textbook. During the class, the instructor handed-out additional reference materials and exercises.

We reviewed the course materials, Instructor's Presentation slides, and class exercises. We concluded the course materials, Instructor's Presentation, and class exercises were comprehensive, substantive, relevant to the course objective(s), complete to address the course objective(s), and useful as a reference resource "back at the office".

However, we identified some concerns. These concerns related primarily to:

1. Some of the material projected on the screen where not legible to the naked eyes. To resolved problem, the instructor increase the font size and made some other adjustments as appropriate.
2. Some of the materials in the student binders were missing some pages. This happened because some materials have front and back pages. In the process of making copies, back of some of these pages were inadvertently not copied. The instructor rectified this omission during

break by making complete set for each student.

ANALYSIS OF STUDENT EVALUATION FORMS

To assess the effectiveness of the course, we reviewed student evaluations, interviewed former class participants and observed the November 2006 course instruction. Details are provided below:

Students' assessment of course materials and evaluation of the instructor are documented in the student evaluation forms. The evaluation forms provide student feedback after taking the course. Each evaluation form has 12 standard ranking questions. Five of these standard ranking questions solicit feedback on the course and the remaining seven solicit feedback on the instructor's performance. To gain an understanding of prior student feedback, we obtained and reviewed the student evaluations from all three classes.

We tabulated students' evaluation and calculated composite score as follows:

1. Computed composite scores for each of the 12 standard ranking questions for each class.
2. Determined the lowest and highest scoring questions, as well as the overall average of all 12 standard ranking questions for each class.
3. Interpreted the results of our analysis
4. Read narrative responses to the four open-ended questions and analyzed trends.

Overall the students gave the course above average scores. Composite scores ranged from 3.90 to 4.10 on a scale of 1 (strongly disagree) to 5 (strongly agree); with a statistical mean of 4.04. Similarly, overall the students graded the instructor above average scores. Composite scores, ranged from 4.14 to 4.57 on a scale of 1 (strongly disagree) to 5 (strongly agree); with a statistical mean of 4.32. We did not identify any trends in the composite scores.

Student narrative comments indicated the course materials and presentation were adequate and provided a "real life scenarios and hands-on experience." Further, student comments indicated the course represented a good introduction to MS Access. However, some students indicated the course was too short, and there was no direct application to auditing. The students believed the font used on the slides was unreadable and recommended that each slide should have 4 to 5 bullets of text. A majority of the students indicated the physical accommodations were good. See table below for details:

Table

Using Data Mining Techniques in Audits and Evaluations

Analysis of Students Evaluation Forms

Statistical Tally (frequency of occurrence)	Strongly Agree	Agree	Neutral	Strongly Disagree	Not Applicable	Total
COURSE/MODULE:						
Achieved objectives	3	13	5			21
Subject content was well organized	3	16	2			21
Course materials were relevant and useful	5	11	5			21
course will help me improve my current or future job performance	8	8	5			21
Overall this course was a valuable learning experience	7	9	5			21
INSTRUCTOR:						
Was organized and prepared	5	15	1			21
Demonstrated knowledge of the subject	13	7	1			21
Effectively communicated subject matter	7	10	4			21
Aroused interest and displayed enthusiasm for the topic	8	11	2			21
Encouraged course participation and interaction among participants	11	10	0			21
Was considerate of and responsive to participants	8	11	2			21
Use class time effectively	8	10	3			21

Scores	Strongly Agree (5)	Agree (4)	Neutral (3)	Strongly Disagree (2)	Not Applicable (1)	Total
COURSE/MODULE:						
Achieved objectives	15	52	15			3.90
Subject content was well organized	15	64	6			4.05
Course materials were relevant and useful	25	44	15			4.00
course will help me improve my current or future job performance	40	32	15			4.14
Overall this course was a valuable learning experience	35	36	15			4.10
INSTRUCTOR:						
Was organized and prepared	25	60	3			4.19
Demonstrated knowledge of the subject	65	28	3			4.57
Effectively communicated subject matter	35	40	12			4.14
Aroused interest and displayed enthusiasm for the topic	40	44	6			4.29
Encouraged course participation and interaction among participants	55	40	0			4.52
Was considerate of and responsive to participants	40	44	6			4.29
Use class time effectively	40	40	9			4.24
						4.32

Interviews of Former Class Participants

We interviewed five former students. The interviews were conducted to determine:

a. If expectations were met,
b. Class strengths/weaknesses,
c. Suggestions for improvements, and
d. Usefulness of the course material and the ability to use learned skills in the workplace.

The former students were selected from the March, June and November 2006 classes. All of the students were employed by different Federal agencies. The interviews were conducted by telephone.

Generally, the comments received during our interviews were similar to the student evaluations. The student evaluations reported the class was well-received. Students indicated that each student interviewed stated they liked the course.

The students indicated the course had strength and weaknesses. For example, a student indicated course strength was the exercises which simulated real life problem scenario. Another student stated course strength was how the course covered so much material in such a short amount of time and provided a good overview without going into more detail than necessary. One student indicated a course weakness was lack of direct application to auditing. Another student indicated that to gain much from the class a prerequisite knowledge of MS Access should be required.

Course Observations

The same instructor taught all four classes. The instructor had extensive MS Access knowledge and data mining experience and multiple professional certifications.

Generally, we found the instructor to be articulate, knowledgeable, engaging, and personable. The physical accommodations were good. The instructor encouraged participation and interaction through class exercises, ice breaker/brain teasers, discussions of past experiences, and student questions. The instructor was considerate of and responsive to the participant's needs. For example, the instructor used sufficient class time to address the participant's questions.

However, we found there are opportunities to strengthen the effectiveness of the course instruction. Specifically, the course instruction could be improved by:

1. adding more class exercises,
2. lengthening the duration for the course from 2 to 3 days;
3. providing a crash course in MS Access so that students can better

appreciate the course.

We obtained and reviewed the student evaluations for the November 2006 class. The student evaluations generally agreed with the impressions of our observers. Overall the students gave the course above average scores. Composite scores ranged from 3.90 to 4.10 on a scale of 1 (strongly disagree) to 5 (strongly agree); with a statistical mean of 4.04. Similarly, overall the students graded the instructor above average scores. Composite scores, ranged from 4.14 to 4.57 on a scale of 1 (strongly disagree) to 5 (strongly agree); with a statistical mean of 4.32..

CONCLUSIONS AND RECOMMENDATIONS

The *Using Data Mining Techniques in Audits and Evaluations* course provides training that is useful to the Federal community. The course needs some enhancements to ensure class materials are accurate and relevant and course presentation is effective. Therefore, we recommend that organizations providing this course in the future consider the following:

1. Revise the course title. The course title - Using Data Mining Techniques in Audits and Evaluations did not accurately reflect the course content. The course focuses on one of the several Data Mining techniques – Microsoft Access at the exclusion of more advanced and complex data mining software. There was no discussion of other advanced techniques or tools. Similarly the limitation of Microsoft Access as a Data Mining technique was not explored. Because only one Data Mining technique was discussed, an appropriate title would be "Microsoft Access as a Data Mining Technique for Auditors and Evaluators"
2. Require a prerequisite knowledge of MS Access for the course
3. Revise course materials to ensure accurate, current, and relevant information to include audit related applications.

IGATI COMMENTS

As of December 2006 IGATI ceased operations.